

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Application No.: 10/517,009

Attorney Docket No.: Q85151

AMENDMENT TO THE DRAWINGS

Applicant submits herewith 1 page of annotated marked-up drawings for Figure 1.

REMARKS

Claims 1-7 have been examined and have been rejected under 35 U.S.C. § 112, first paragraph, and under 35 U.S.C. § 102(b).

I. Preliminary Matters

The Examiner has objected to the specification and the Abstract as being unclear in regard to the terms “chopping operation,” “chopping dedicated axis,” and “contour control.”

Accordingly, Applicant has amended the Abstract in a manner believed to overcome the objections. Applicant submits that amendments are fully supported in the specification and figures. In regard to the definition of “chopping operation” and “contour control,” Applicant submits that such definitions are standard in the art, and thus, do not constitute new matter (i.e., a common definition is merely being provided for a term already present in the specification).

Further, in regard to the claimed “chopping dedicated axis,” Applicant refers to the Examiner to page 1 of the Application, which explains that the chopping dedicated axis is an axis that is other than (or additional to) the normal control axes. The chopping dedicated axis is specifically referred to as a “chopping axis,” where page 2 of the specification discloses the “chopping axis” as the z-axis about which a grinding stone is operated (see Fig. 10).

Also, by this Amendment, Applicant has incorporated claims 4 and 5 into claim 2, and has amended claim 1 to include similar subject matter as claims 4 and 5 into claim 1. Therefore, Applicant has canceled claims 4 and 5, without prejudice or disclaimer.

II. Rejections under 35 U.S.C. § 112, first paragraph

For the reasons set forth on pages 2 and 3 of the Office Action, the Examiner has rejected claims 1-7 under 35 U.S.C. § 112, first paragraph, as not being described in the specification in such a way as to enable one skilled in the art to which it pertains.

Accordingly, Applicant has amended the claims in a manner believed to overcome the rejection. In addition, Applicant submits that following comments.

On page 2 of the Office Action, the Examiner inquires as to what the workpiece is. However, the workpiece is merely a piece or object that will be machined by the claimed machine tool (the specification provides an example of a machine tool, i.e., a grinding machine). Workpieces are shown in Figures 10 and 11. Applicant submits that the specific “type” of workpiece is not necessary to the claim or invention, and therefore, does not need to be fully defined in the specification. Applicant submits that one skilled in the art would understand the common term “workpiece,” without further explanation.

The Examiner is unsure what comprises the chopping movement. However, as clarified in claim 1, the chopping operation is for cutting or shaping a workpiece, and the movement data relates to data regarding the movement of the machine tool. Applicant directs the Examiner’s attention to at least the non-limiting embodiment of Figures 10 and 11, which shows the chopping movement (i.e., chopping operation), along the z-axis, for shaping the workpiece by the grinding stone (also see specification page 2). In further detail, although Figure 10 shows a “conventional” chopping control process, the figure is applicable, as a non-limiting example, to show the basic

movement of the grinding stone, to cut or shape the workpiece, along a z-axis, while the workpiece is moved along the X or Y axis (i.e., control axes). If, for example, the workpiece is moved in the X and Y axes, while the tool "chops" by reciprocating on a different axis (for instance the z-axis), this will result in controlling the contour along which the workpiece is cut ("contour control").

The Examiner is also unsure as to what the recitation, "at the same time," recited in the last line of claim 1, means. Applicant submits that support for the claimed feature is found in the non-limiting embodiments on the last paragraph beginning on page 4 and ending on line 9, page 5, as well as on page 11. Basically, the movement of the workpiece and the tool can be controlled by the same command.

Regarding claim 3, the Examiner is unsure how the data is "convoluted." Applicant submits that the term convolute, as used in the present Application, means to superimpose. Applicant refers the Examiner to the non-limiting embodiment of Figure 3, where the chopping operation is convoluted (or superimposed) on the contour control. Further, the X-axis and the Y-axis reciprocate between the dotted lines and the center of the reciprocation moves in a +X direction in an arc.

In regard to claim 4, the Examiner inquires as to what is a "servo delay." Applicant submits that the term "servo delay" is commonly understood by one skilled in the art as generally meaning a time lag between a time that a control command is sent to a servo from an NC controller and a time that a motor actually begins to move. As disclosed in the non-limiting

embodiment on page 10 of the Application, the axial control processing part 13 constitutes the claimed correcting means. Further, as disclosed on pages 14 and 15 of the present Application, the specific portion of the axial control processing part 13, that corrects the servo delay, is the error correction controlling part 131 (see Figures 2). Specific teachings regarding the correction of the servo delay are also provided in the non-limiting paragraph beginning on page 5 and ending on page 6. Accordingly, one skilled in the art would clearly be able to make and use the invention as set forth in the Application.

Regarding claim 5, the Examiner inquires as to how the information is synthesized. Applicant refers the Examiner to the non-limiting paragraph beginning on page 14 and ending on page 15, where the synthesizing is shown in the non-limiting embodiment of Figure 8(a). Applicant submits that one skilled in the art would clearly understand how to make and use the invention based on such disclosure.

The Examiner also inquires as to what is a chopping interpolation vector and a contour control interpolation vector, as recited in claim 5. As shown in Figure 8(b), an interpolation amount for a servo delay is synthesized in the direction of the synthetic vector of the chopping interpolation vector and the contour interpolation vector. The interpolation vector for the delay error is distributed to the chopping interpolation vector and the contour interpolation vector.

In regard to the processing program recited in claim 6, the Applicant directs the Examiner's attention to the non-limiting embodiment on page 9, the second full paragraph, which discusses the claimed processing program. Further, the claimed ladder portion is shown in the

non-limiting embodiment of Figure 1, and is discussed in, for example, page 11 of the Application. Applicant submits that one skilled in the art would understand the recited ladder portion. In particular, NC machines are often programmed using ladder diagrams or ladder language programs, where graphic symbols are used to represent commands, and branches represent “if-then” decisions. Accordingly, a thorough description of such common term is not necessary to the instant invention.

Also, Applicant has submitted herewith an annotated marked-up drawing for Figure 1. The marked-up drawing depicts the processing program 24 described on page 9, first paragraph of the specification. Applicant respectfully requests the Examiner to indicate if the annotated drawing is approved.

Finally, in regard to claim 7, the Examiner inquires as to what parameters are being claimed. However, as set forth in the claim, it is the various data regarding the chopping operation command. Further, in the paragraph beginning on page 1 and ending on page 2, various non-limiting examples of parameters are provided.

In view of the above, Applicant submits that one skilled in the art would be able to make and use the invention in view of the specification and figures. Accordingly, Applicant respectfully requests the Examiner to withdraw the rejection of claims 1-7 under 35 U.S.C. § 112, first paragraph.

III. Rejections under 35 U.S.C. § 112, second paragraph

The Examiner has rejected claims 1-7 under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite. However, in view of the amendments to the claims, and the comments set forth above, Applicant submits that claims 1-7 are not indefinite.

IV. Rejections under 35 U.S.C. § 102(e)

The Examiner has rejected claims 1-7 under 35 U.S.C. § 102(e) in view of U.S. Patent No. 6,591,148 to Masuda et al. ("Masuda")

A. Claim 1

Applicant submits that claim 1 is patentable over the cited reference. For example, claim 1 recites a correction means that synthesizes an acquired servo delay amount of each control axis, and distributes the synthesized servo delay amount to a chopping interpolation vector and a contour control interpolation vector.

Applicant submits that Masuda fails to teach or suggest the synthesizing of the servo delay amounts of each control axis, or that such amounts are distributed to the respective interpolation vectors. Accordingly, Applicant submits that claim 1 is patentable over the cited references.

If the Examiner wishes to persist in the above rejection of claim 1, Applicant respectfully requests the Examiner to specifically indicate where the above claimed features are taught in Masuda.

B. Claim 2

Applicant submits that claim 2 is patentable for at least analogous reasons as set forth above for claim 1.

C. Claim 3-7

As set forth above, Applicant has canceled claims 4 and 5, without prejudice or disclaimer, and has incorporated such features into claims 1 and 2.

In regard to claims 3, 6 and 7, Applicant submits that such claims are patentable at least by virtue of their dependency.

V. Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

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